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An Investigation on Termites Management in Eswatini: The Case of Mahlalini Chiefdom

M. Thwala, S.S. Singwane, S.D. Mabaso, I.B. Van Zuydam and S.F. Mamba

Department of Geography, Environmental Science and Planning, University of Eswatini, Private Bag 4, Kwaluseni, Eswatini

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Corresponding Author:
S.S. Singwane,
Department of Geography,
Environmental Science and Planning,
University of Eswatini, Private Bag 4,
Kwaluseni, Eswatini

ABSTRACT

This research investigated the management of termites in Eswatini using Mahlalini chiefdom as a case study. The issues raised by the study included people's perception on the challenges posed by termites on farmland productivity and people's livelihoods; strategies employed to manage termites in Mahlalini chiefdom; as well as the challenges faced by residents in the management of termites. Data was collected by using semi- structured face-to-face interviews which were administered to 113 heads of homesteads and key informants, as well as direct observation guided by an observation guide and a camera. The heads of homesteads were selected through simple random technique and they comprised 30% of the homesteads at Mahlalini chiefdom. The findings indicate that termites are perceived as a serious problem since they have an effect on land productivity as well as on the livelihood of the residents. In an effort to control termites in their homesteads, crop land and grazing land, community members employ both chemical and physical methods. The findings also reveal that the most serious hindrance to termite management is lack of knowledge on how to control termites in the area, hence the need for capacity building.

Key words: Termites management, Mahlalini chiefdom, Farmland productivity, People's livelihoods, land

INTRODUCTION

Land degradation is the reduction in the physical, chemical or biological status of land which may affect its productive capacity, particularly agricultural productivity, the environment and food security[1]. Consequently, land degradation has resulted in the loss of the soil's productive capacity which is a great concern to the local people[2] who are mainly subsistence farmers. Furthermore, land degradation commonly denotes a loss of land productivity[3]. However, evidence on the physical extent of land degradation is patchy, particularly in developing countries. For instance, the most thorough estimates available indicate a severe magnitude of land degradation striking some of the world's very poorest. As such, it is estimated that 0.3 to 0.5% (5-7 million hectares) of the total world arable land is lost annually due to land degradation[4]. Among the many causes of land degradation, termites play a major role. Termites are social insects which feed on diverse organic substances such as dry grass, wood, animal litter and growing plant tissues[5].

They are extremely devastative and polyphagous insect pests, which damage buildings, furniture, plants and agricultural crops, such as cereals, pulses, oil crops, sugarcane, fruits and vegetables, as well as root crops[6]. The challenges brought about by termites

Fig. 1: Drywood, subterranean and dampwood termites Source: [8]

are widespread and can be observed mainly in the agricultural sector namely forestry (seedlings), rangelands and in wooden structures, to mention but a few. They are widely dispersed throughout the tropics as well as some temperate regions and achieve their highest diversities and abundance in the rainforests of Africa, South America and Southeast Asia[7]. Of these, there are more than 2300 different species of termites now recognized. However, most of the diversity can be lumped into distinct groups namely, dampwood, drywood, subterranean (Fig. 1) and mound builders.

In tropical and subtropical soils, termites are common soil micro-fauna that regulate some soil processes and also play an important role of nutrient recycling[9]. Termites can either be beneficial or destructive species are present, human beings, depending on which species are present and their feeding and nesting behaviour[9]. These insects, among the beneficial functions, are largely responsible for the observed chemical and physical modifications of soils in the tropics. Noteworthy is that termites are important components of biologically mediated feedback to land-use change in the tropical region. For example, it was noted that termite mounds were common in previously cleared areas, in the tropics of Central Amazonia and in such areas vegetation re-establishment seemed to be constrained by the termite activity[10].

Generally, termites are primarily tropical wood digesting insects made up of intricate groupings of species with diverse social behaviour, morphology and ecology such that they resulted in a controversial scientific classification and naming system. Taxonomically, all termites can be placed into Kingdom *Animalia*, Phylum *Arthropoda*, Class *Insecta* and Order *Isoptera*. These tropical insects, however, are generally known to have a controversial nomenclatural and phylogenetic status. Although termites come in many shapes and sizes, every termite is common to the Order *Isoptera*[7]. Until recently, they were considered to form the Order *Isoptera* but a number of taxonomical studies have shown that termites are indeed a type of cockroach and, as such, they should be classified under the order *Blattaria* (also known as *Blattodea*)[11]. It has been proposed that *Isoptera* be retained as an unranked name within *Blattaria* like this (*Blattaria: Isoptera*), until cockroach phylogeny is better resolved and an appropriate ranking can be applied. Evidence suggests that there are 2,761 termite species worldwide[7].

In terms of characterization, termites are eussocial insects, that is, insects that live in colonies composed of individuals (i) from more than one generation (such as parents and offspring)(ii) presenting cooperative care of the young and (iii) showing reproductive division of labour[7]. A termite colony is made up of a king and a queen, commonly known as a 'reproductive pair' and their offspring which are usually a large number of non-productive individuals, who are either workers or soldiers[7]. Eventually, the reproductive pair originates reproductive offspring, which swarm out of the nest to establish a new colony. Therefore, a termite colony, can be grouped into morphological castes, which can be either reproductive (king, queen and their reproductive offspring) or sterile (workers and soldiers). As with other biological systems, exceptions apply: *Neotropical Apicotermitinae* (Termitidae) termites do not possess soldiers and *Kalo termitidae* and *Termopsidae* (traditional sense or *Archo termopsidae* in the new classification) also do not possess true workers[7]. Instead, their immature nymphs do most of the tasks of the colony. Such nymphs called *Pseudergates* are comparable to "child labour". *Pseudergates* are developmentally flexible and retain the capacity to differentiate into other either into soldiers or secondary reproductives by molting[7].

Regarding damage to buildings and infrastructure, termite can be either active or inactive and it often takes an experienced inspector to notice the difference. Normally, termites can damage any wood (cellulose) containing materials used in the house construction such as timber, softwood and hardwood paneling and masonite products. They can also damage cellulose materials such as books, paper, cardboard, wallpaper and paper covering on drywall[12]. The wood or cellulose that

has been infested with termites is usually damp and invaded by fungi. Termites feed in the larger, softer areas of the wood first (between the tree growth rings of the wood). The resulting damage appears 'lattice-like'. As the wood is eaten, the empty spaces are replaced with soil. Wood is rarely completely eaten and the size and shape of the wood is maintained. Usually they only eat about 10-20% of the total wood volume. Termite damage is easily distinguished from other insect or rot damage[13]. For instance, carpenter ant damage is distinctly different from termite-damaged wood. Occupied galleries are kept very clean, resulting in the surface having a 'polished' look. These ants prefer to infest wood that is moist and rotting and will sometimes use wood that has been 'hollowed out' by termites. They push sawdust and other debris outof their galleries, often resulting in a cone-shaped pile accumulating just below the nest entrance[13].

Termites can be said to be seasonal insects whose most favourable season is spring, where a swarm of winged termites (swarmers) appear. This swarm later disperses to mark the beginning of new colonies and the process continues resulting to more and more colonies. Motivated by rainfall and warm temperatures, termites (winged) come out of their colony and fly after a prolonged period of incubation, which usually last for a minimum of five years (to maximum of 8 years) to drop to the ground later and start a new colony all over again[13].

Termites cause major disruptions in rural livelihoods worldwide, particularly in tropical regions where the warm climate favours the procreation of these insects. The ever growing interest in sustainable agriculture and food security in the African continent highlights the need for a more balanced approach to termite control, which will prevent serious ecological damage and loss of ecosystem services provided by termites, whilst using the available resources in a sustainable manner[14].

The damage caused by termites is greater during periods of drought than during periods of normal rainfall. Termite infestation has several effects such as agronomic, economic and social constraints. The agronomic influence includes the role of termites as pests and ecosystem engineers; whereas, the economic aspect involves the destructive tendencies of termites due to their foraging activities on plants and wood products which cause economic hardship to individual producers[15].

In Eswatini, a majority of people still live in rural areas. They derive their livelihood from subsistence agriculture. The small holder farming sector predominantly produces food crops such as maize (staple cereal), sorghum, grains legume crops and vegetables as well as keep livestock; mostly cattle, goats and chickens. This sector takes about 60% of the arable land. Agricultural activities on Swazi Nation Land (SNL) are predominantly characterized by low- input practices that are largely dependent on natural rainfall and local resources. As a result, small holder farming only contributes 11% of the agricultural commodity value which is 1.2% of the Gross Domestic Product (GDP)[16]. Therefore, termite activities push further an already hopeless situation.

The control of termites involves both preventive and curative measures. The use of chemical pesticides is the main management method. Pesticides targeting termites are more efficient, especially in eradicating colonies, when their toxic effects are magnified through increased pesticide contamination via social behaviours like grooming among individuals of the same colony[17]. However, chemicals are expensive and have many harmful effects. Other than the use of chemicals, there are several physical methods which are also employed in the control of termites. These include physical digging of termite mound for the removal of queen and the use of sand particles as barrier that could act as physical exclusion device. In addition to the chemical and physical methods, there is biological control, which involves the use of predators against termites. Biological control methods are more environmentally friendly compared to chemicalcontrol[11].

In particular, chemical control of termites in plantations and farms is expensive and require skilled labour and may not be effective in all cases. The excessive application of termiticides causes environmental pollution and may result in the death of non-target organisms. This in turn necessitated the ban of some chemical control measures and advocacy for biological control methods. For instance, in Ghana, farmers use several indigenous methods to prevent and control termites which include wood ash, sand, toads and shell/scallop of tortoise[18]. It is also imperative to investigate how farmers manage termites in the Kingdom of Eswatini, hence the study carried out at Mahlalini area. Mahlalini is a rural area situated in the Shiselweni district and Middleveld region of the Kingdom of Eswatini.

Termites have affected farmers' livelihoods directly through damaging crops and their houses and indirectly by decreasing the soil fertility of farmlands. In terms of the latter, termites have contributed to poor soil fertility due to land degradation and decreased the size of arable land by making the land non-productive. In turn, crop production and land productivity have decreased thereby affecting people's livelihood[9].

The Kingdom of Eswatini, especially in the rural areas, is currently facing tremendous challenges in the quest of

pursuing sustainable development and food security. For instance,arable land is disappearing rapidly, yet communities that depend on it for their livelihoods are growing. Other challenges faced by the country include soil erosion, haphazard location of agricultural activities, out-dated grazing practices and an ever-expanding population as well as changing needs of the rural society[19]. As noted in the previous sub-section, termite infestation results in agronomic, economic and social constraints. Agronomically, termites act as pests and ecosystem engineers, whereas economically, they have destructive tendencies through their foraging activities on plants and wood products, which result in economic hardship among individual producers.

In the Kingdom of Eswatini, 70% of the population live in rural areas and depend on subsistence agriculture for a livelihood. Therefore, termite infestation coerces rural communities to find alternative measures to cope with termite problems. The way people deal with termites also differs from country to country depending on the resources they have at their disposal. Few studies have been conducted on termites in the Kingdom of Eswatini, with most of them focusing on the types of termites and their distribution. So it is important to establish how Mahlalini community members in Eswatini are affected by termites and how they handle them, as well as the challenges they encounter in their endeavor to harness the problem.

The main objective was to investigate termites' management in Eswatini using Mahlalini chiefdom as a case study. The specific objectives were:

- To investigate people's perception on the challenges posed by termites on farmland productivity and peoples' livelihoods.
- To establish the strategies employed to manage termites in Mahlalini chiefdom.
- To investigate the challenges faced by residents in the management of termites.

MATERIALS AND METHODS

Study area: Mahlalini chiefdom is under Shiselweni 2 constituency in the Shiselweni administrative region of Eswatini. The chiefdom lies between latitudes 26°59' and 27°00' S and longitudes 31°14' and 31°18' E (Fig. 2). This is a good area for termites since they are widely distributed throughout the tropics as well as some temperate regions[19]. Mahlalini chiefdom is in the Highveld physiographic region of

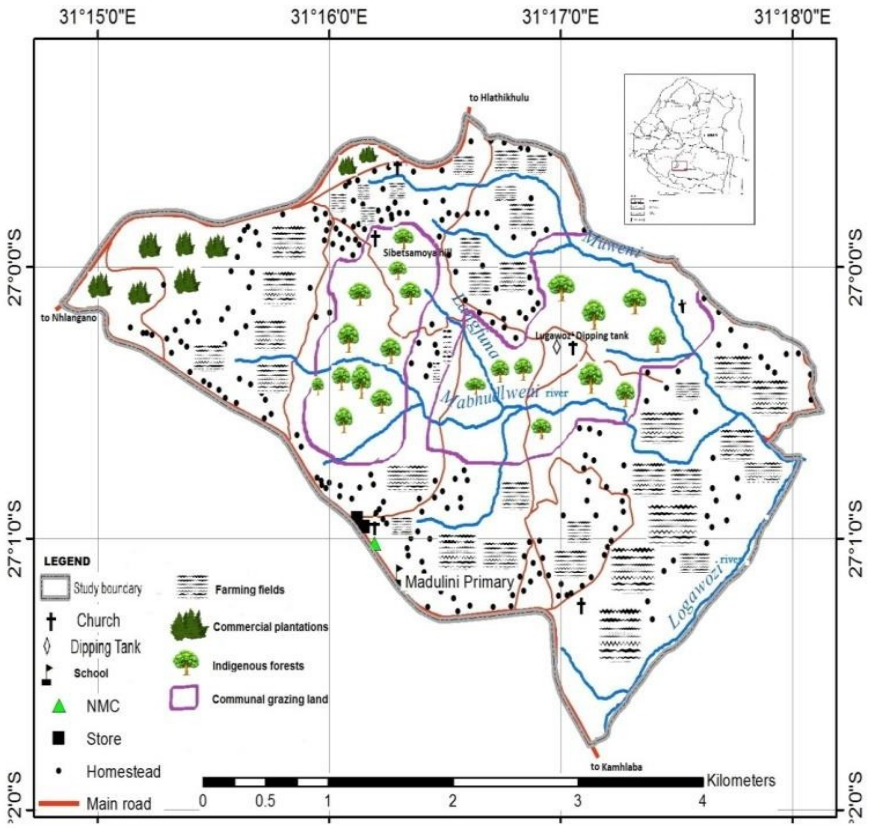

Fig. 2: Mahlalini chiefdom

Eswatini. The Highveld is characterized by wet summers and dry winters. The wettest season occurs between October and March, when around 80% of the year's rainfall is received. Rainfall and other precipitation peaks at around February after initially starting to fall in mid-October. February is the warmest month with an average temperature of 26°C at noon and June is the coldest with an average of 8°C noon temperature. Frost days are common during winter. These conditions are conducive for termites; hence their abundance in the area.

There are three perennial streams in the chiefdom and these are Mabhudlweni, Lugawozi and Lang'funa (Fig. 2). The landscape of Mahlalini gives impetus to land degradation in terms of soil erosion. The area is composed of igneous and metamorphic rocks, with granite being the most dominant rock. The soil in the area is high in lixisols (lx) soil, with clay-enriched lower horizon and high saturation of bases. As such, the following soil profiles are found in the area: ferrisolic-deep red loam which is very acidic; raw mineral-rock outcrops and stoney ground; ferralitic- pale red sandy loam on rotten rock; lithosolic-shallow grey sandy loam on hard rock. This makes the area to be vulnerable to mound building termites (Fig. 3). Notably, mound building termites require a certain amount of clay or other colloidal material to cement particles together[20]. Based on that, there are no mound building termites in pure sands[20].

There are also some natural forests that occurred along river valleys. Exotic trees such as wattle, pine and eucalyptus forests also grow well in this region. Noteworthy is that, termites largely depend on eucalyptus trees for their food[20]. Furthermore, Mahlalini chiefdom is mostly dominated by grazing land and crop farming, with maize being the mostly grown crop. Evidence suggest that grass-eating termites are abundant in areas grazed by livestock, hence the susceptibility of Mahlalini to termite infestation[20].

Research design: The study employed a cross-sectional research design, which acquires quantitative and qualitative data using closed-ended and open-ended questions. A cross-sectional design measures different groups of people at the same point in time and is often called a survey design[21].

Sources of information: Out of 376 homesteads at Mahlalini chiefdom, 30% were sampled using a simple random sampling procedure. This means that a total of 113 homesteads were selected. Heads of homesteads were the primary targets; however, in cases where the homestead head was not available, any individual who was above the consented age of 18 years was interviewed. Traditional authorities, namely the headman and ward-elders (*Imisumpe*) were key informants. Direct observations were also carried out on observable phenomenon such as materials that were attacked by termites as well as areas that were infested by the insects in the study area.

Fig. 3: Termite mound on grazing land at Mahlalini

Information collected: The study sought to find out the problems and challenges that are caused by termites within homesteads, which include the type of material used and loss in economic terms; in the fields the interest was on types of crops grown and those affected by termites. On rangelands, the study investigated farmers' experiences on the effects of termite activity as well as the time of infestation. It was also necessary to find out if there were any programs or mechanisms that have been invoked in trying to manage termites in the area. The study also sought to find out if there are any constraints in managing termites in the area, as well as the nature of those constrains or challenges. These involved financial, knowledge and organizational formations.

Data collection: Personal interviews guided by an interview schedule were conducted with heads of homesteads, after seeking permission to conduct the survey from the traditional authorities. Key informant interviews were also conducted with traditional authorities of the area, namely the headman and ward-elders (*Imisumpe*). The study also employed direct observations guided by an observation guide whereby the types of trees, crops grown and the materials used in the household buildings that were attacked by termites were observed.

RESULTS

The presentation of findings focuses on termites' activity within homesteads, on crops and on grazing land.

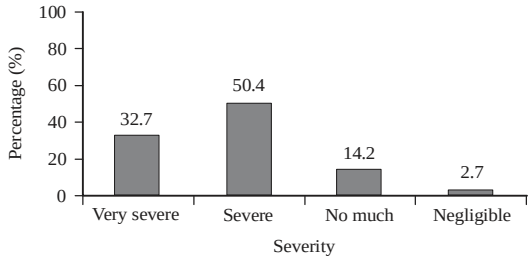

Fig. 4: Ratings on the severity of termite activity within homesteads

Table 1: Effects of termites within homesteads

Effect	Frequency	Percentage (%)
Houses break down	48	44.0
Fencing poles had to be frequently replaced	39	35.8
Kraals become weakened	12	11.0
Other	10	09.2
Total	109	100.0

Termites within homesteads: The survey revealed that 96.5% of the respondents had termites within their homesteads while 3.5% had no termites within their homesteads. In contrast, the ward elders unanimously indicated that the whole chiefdom was infested with termites. Such a situation can be understood on the backdrop of the nature of termites as some are subterranean and could not be visible. Among the respondents who indicated that there were termites within their homesteads, 50.4% pointed out that there was severe termite activity, while 32.7% indicated that it was very severe (Fig. 4). Moreover, 14.2% pointed out that there were not much termites, with the remaining 2.7% indicating that it was negligible.

The presence of termites in the area has devastating effects for the residents as 44% of the respondents indicated that their houses were breaking down (Table 1 and Fig. 5a). Moreover, 35.8% of the respondents reported that they have to frequently replace fencing poles as they are damaged by termites (Table 1 and Fig. 5b). Furthermore, 11% of the respondents indicated that termites' attacks weaken their kraals (Table 1).

The study also revealed that there are negative impacts of termites' activities in many homesteads. For instance, 72% of the respondents pointed out that they have suffered a loss of property due to termites' activity, while 19% believed that termites activities have led to poverty and 2% of the respondents have lost their source of income (Fig. 6).

Regarding measures taken to control termites, the findings depict that 54.9% of the respondents had tried certain means in their homesteads to minimize the impacts of termites

Fig. 5a: Homestead roofing attacked by termites

Fig. 5b: Termites on a fencing pole

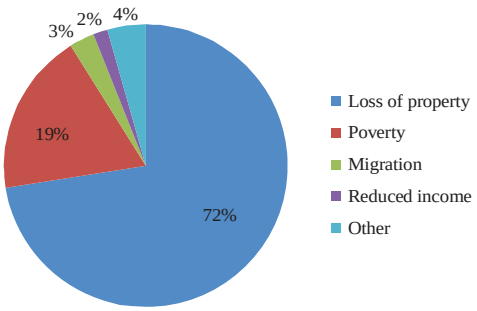

Fig. 6: Impacts of termite activity within homesteads

whereas 45.1% had not attempted anything. Reasons for not attempting to control termites included: lack of knowledge, unavailability of chemicals and lack of money to purchase chemicals. The attempted termite control measures include blue death, alcotine, jeyes fluid as well as digging termite mound and removing the queen. Regarding, effectiveness of the termite control measures the findings indicate that 16.1% of the respondents revealed that they were effective. A majority (54.8%) of the respondents indicated that the control measures were partially effective, meaning that they work for a short-term, thus the termites always reappear. In contrast, 29.1% of the respondents argued that the control measures were not effective atall.With respect to benefits derived from termites, 15% of the respondents believed that there were

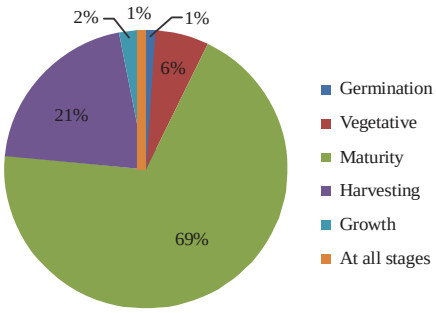

Fig. 7: Stage when crops are affected by termites

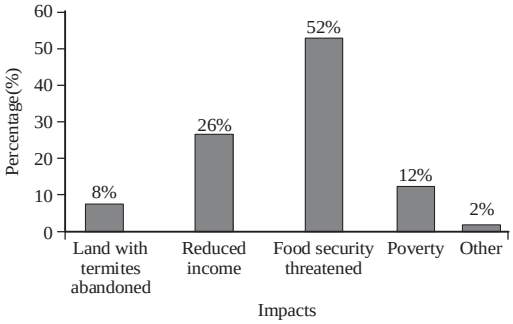

Fig. 8: Impacts of termite activity on crops

benefits such as chicken feed, especially during swarming. However, 77% of the respondents believed that there were no benefits from termites, while 8% pointed out that they were not aware of any benefits derived from termites.

Termites on crops: The findings reveal that the crops that are grown in the area include maize, beans, groundnuts, jugo-beans, pumpkins, sweet-potatoes, potatoes and sunflower. Noteworthy is that, these crops are all affected by termites. Regarding the growth stage at which termites area nuisance to crops, 69% of the respondents indicated that termites damage on crops start to be visible during maturity stage (Fig. 7). On another note, 21% of respondents only realize at the harvesting stage that their crops have been attacked by termites, while 6% indicated that their crops are attacked at vegetative stage (Fig. 7).

From the findings it emerged that due to termite activity, respondents felt that food security was threatened (52%) at Mahlalini chiefdom. Moreover, income that is normally generated through crop farming is reduced (26%) and as a result, some farmers resorted to abandoning the land that is infested with termites (8%). This, in turn, resulted in a reduction of arable land, hence the yield is also affected (Fig. 8). It was noted that such impacts sometimes lead to poverty (12%).

Despite the severity of the impacts of termites on crops, the findings indicate that 24% of the respondents have applied control mechanisms. A majority (76%) of the crop farmers have not applied any mechanism. For those who have applied some control mechanisms, they use chemicals such as alcotine and pesticides such as blue death. Those who have not applied any control mechanisms cited lack of knowledge and skills on how to control termites. Moreover, some of the respondents indicated that they have financial challenges which constrain them from buying chemicals.

Fig. 9a: Grazing land degraded by termites

Fig. 9b: Feeding pattern of harvester termites

Termites on grazing land: From the findings, it emerged that 53% of the homesteads at Mahlalini were raising livestock; namely cattle and/or goats. These animals graze on communal pastures (90%) with only 10% of the respondents grazing their goats on individual land holdings. All the respondents unanimously agreed that there are termites on the grazing land and that they have an effect on the productivity of the land (Fig. 9a, 9b). For instance, 88% of the respondents believe that termites compete with livestock for feed (Fig. 10).

Termites that are responsible for causing damage on grazing land are mostly harvester termites (*Ematheza* or *Emagenge*) which are grass-eating termites (Fig. 11). These termites feed in progressive stages, leaving bare soils behind (Fig. 9a, 9b).

Regarding strategies employed to cope with termites on grazing land, the findings reflect that 26.7% of the farmers have made some attempts to cope with the devastating

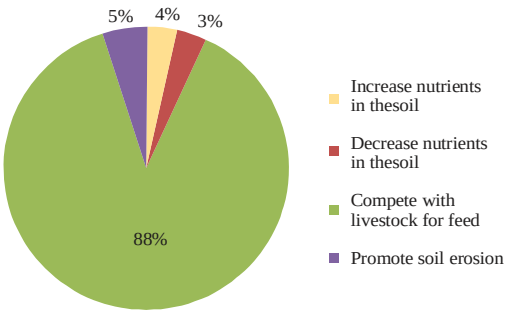

Fig. 10: Effects of termites on grazing land

Fig. 11: A harvester termite Source: [22]

Table 2: Reasons for not applying coping strategies

Reason for not applying coping strategies	Percentage (%)
Termites cannot be controlled	5
Available mechanisms are not effective	3
Lack of labour to apply control mechanism	14
Lack of money to buy chemicals	45
Chemicals not available	14
Lack of Knowledge and skill to apply control mechanism	19

effects of termites, while 73.3% have not attempted to address or cope with this problem at all. This may be partly due to the fact that most of the farmers graze their livestock communally (90%), hence a 'tragedy of the commons'. Some of the coping strategies employed include; reducing the number of livestock, destroying termites using chemicals, physically digging termite mounds and removing the queen, as well as loaning livestock (*kusisa*) to people in areas which are not infested with termites. For those who have not tried any means to cope with the situation, they cited lack of money to buy chemicals (45%) as a major constraint, while 19% indicated that they lack knowledge and skill to apply control mechanisms (Table 2). Notably, only 3% raised concerns that the available control mechanisms were not effective.

It transpired that respondents believe that the government should play a proactive role in initiating programmes which will help to eradicate the problem of termites in the area. Unfortunately, according to the headmen of the area, there has not been any programme that has been invoked, either by the community or by the government, to combat termites. Worse still, there were no specific community-wide plans on how to deal with the problem except for isolated commitments by individuals within their vicinity.

DISCUSSION

The rationale for the study is that, although communities in the Kingdom of Eswatini are affected by termites, the information on the extent of that damage has not been adequately documented. For instance, with regards to people's perception on the challenges posed by termites on farmland productivity and people's livelihood, the research findings are corroborated by those of a study conducted on indigenous knowledge of termite control in Gushegu District of Northern Ghana[23]. The findings revealed that termite damage is not limited to crops only but affect all sorts of resources, such as wood products including buildings and fencing poles. These findings corroborated with those of studies conducted in Riau (Indonesia) and Johor (Peninsular Malaysia) where it was observed that termites are wood feeders, slightly organic and intermediate feeders[24]. According to studies conducted in Johor in Malaysia and Riau in Indonesia, termites construct their nests in different types of habitats and hence their classification as soil nesters, wood nester and slightly arboreal nester, among other classifications[24]. Furthermore, the findings also verify that grass-eating termites are often numerous in tropical and sub-tropical grasslands grazed by stock[20]. These termites compete with livestock for feed as a result the land become denuded.

The findings further showed that the activities of termites have negative effects, both on farmland productivity and people's livelihood. With regard to farmland productivity, the findings reveal that termites compete with livestock on grazing land and make the land barren. This, in turn, affects the quality of livestock. On cropland, termites affected almost all crops. This then directly lead to reduced productivity of the land. These findings are in agreement with those of a study carried out in Gushegu District of Northern Ghana, where it was observed that the crops grown and more importantly affected by termites comprised yam, maize, cassava and pepper[23]. In this case, the crops were often witnessed to be extensively damaged before or after harvest in accordance with the study conducted in the Gushegu District of Northern Ghana[23]. On the other hand, termites forced people to abandon the infested land and this also reduced the productivity of the farm land.

With regard to people's livelihood, it was revealed that termites' activities result to food insecurity as well as poverty

by affecting farmlands productivity. This is the case despite the fact that people in this area are dependent on farming for their livelihood. Evidence from existing literature denotes that decreased crop productivity affect the livelihoods of a community[9]. With respect to the coping strategies the findings indicate that residents employ various strategies to manage termites in Mahlalini chiefdom. This was particularly the case, with regard to controlling termites within homesteads where most homesteads had applied control mechanisms. However, on farmlands, the situation was radically different as only a few crop farmers had applied control strategies. Similarly, only a few livestock farmers indicated that they have applied controlling strategies. The coping strategies that have been applied in the area range from direct to indirect. The direct strategies include chemical control as well as physical control strategies. The chemicals include the use of alcotine, the use of fumigants such as motor oils as well as the use of pesticides such as blue death. The physical methods included digging of termite mounds and removing the queen, as well as giving them to predator animals such as feeding poultry. These finding are in agreement with those of the study conducted in the Gushegu District of Northern Ghana, where it was observed that termites were used by farmers as a cheap source of protein feed for chickens[23]. In the same vein, existing literature indicate that a number of countries in Africa are using termites as food and feed for their poultry[25]. The indirect coping strategies on the other hand, included abandoning land with termites as well as reducing the number of grazing livestock by way of loan schemes (*kusisa*). With respect to the challenges faced by residents in their quest to manage or cope with the problem of termites the findings corroborates with existing literature where re-infestation is highlighted as a major challenge in managing multi-genera termite faunas[9]. The findings also reveal that the methods used to control termites were partially effective. This was mainly because the methods used to control termites are able to eliminate the colony, but it always reappears. Another constraint that was uncovered by the study was lack of knowledge on how to control termites. This was especially the case with regard to termites affecting crops. The findings revealed that farmers would like to control termites in their fields; but, they do not know what to do in order to deal with the problem. This limitation highlights the need for anational drive towards building capacity within communities and chiefdoms, which would ensure that people are better informed and equipped with knowledge and actions to take. Finally, the study uncovered that people had challenges in trying to purchase the chemicals that are useful in controlling termites. These findings are corroborated by existing literature which indicate that the predominance of poverty in Africa limits ease of access to chemical control methods which are expensive and necessitates expertise to use, hence unaffordable[25]. Consequently, African communities have developed and applied traditional methods in order to eradicate and or control termites on farmlands and homes. This is further echoed by findings from a study conducted in Nagojje sub-county, Buikwe district, where it was noted that chemical control of termites is expensive and calls for skilled labor. Noteworthy is that, excessive application of termiticides cause environmental pollution, which may result in the death of non-target organisms.

CONCLUSION

In a nutshell, termites' infestation is a major problem affecting crops, rangelands and homesteads at Mahlalini chiefdom. The problem of termites has been in the area for quite a long time and it is severe. Termites have affected farmers' livelihoods directly through damaging their crops and houses and indirectly by competing with livestock for feed on grazing lands. The decrease in crop productivity due to land degradation, combined with the direct damages caused by termites on crops, has affected farm income and household food security. The most frequently used termites control strategies in Mahlalini chiefdom are pesticides, followed by physical methods such as digging out the queen of the colony. Lack of knowledge and skills on how to control termites is a major challenge in the chiefdom, which highlighted the need for capacity building within communities and chiefdoms. On the other hand, for some people who had the knowledge on how to control termites, they lacked the funds to buy the necessary chemicals.

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